

Spectral Identification No: 1

A) Preliminary Observation

i] IR Spectroscopy

Observation	Inference
a) Strong observation at 1724 cm^{-1}	C=O stretching i.e. acid, ketone, aldehyde may be present
b) Medium observation in region $3100 - 2900 \text{ cm}^{-1}$	C-H stretching aryl/vinyl (sp^2) { alkyl C-H (sp^3) may be present

ii] ^1H NMR Spectroscopy

Observation	Inference
a) Total 4 peaks are present	4 types of proton present in the structure
b) 2 peaks are present in the region $6.5 - 8.5 \text{ ppm}$	Aromatic ring is present

iii] ^{13}C NMR Spectroscopy

Observation	Inference
a) Total 7 peaks are present	7 types of carbon atom is present
b) 4 peaks are present in region $100 - 170 \text{ ppm}$	Aromatic ring is present

iv] UV Spectroscopy

Observation	Inference
a) There are 2 peaks in UV spectrum about 220 nm	Compound is conjugate

II] ^1H NMR spectrum

Observation	Inference
a) Total 4 peaks are present	Total 4 type of proton present
b) 2 peaks at 6.5-8.5 ppm	Aromatic ring present
c) There are 2 doublets in aromatic region.	Para-disubstituted aromatic ring present.
d) Singlet peak at 3.9 ppm	Due to CH_3 adjacent to O
e) Singlet peak at 2.5 ppm	Due to CH_3 at aromatic.

III] ^{13}C NMR spectrum

Observation	Inference
a) Total 7 peaks are present	7 type of carbon is present
b) 4 peaks are present in region 100-170 ppm	Aromatic ring is present
c) Signal at 169 ppm	Due to ester carbon atom
d) There are 4 peaks in aromatic region i.e. 100-170 ppm	Para disubstituted benzene ring present
e) Out of 4 aromatic signal, 2 are missing in DEPT 135	2 quaternary C-atom present in aromatic ring.
f) Signal at 79 ppm in proton decoupled spectrum.	Due to solvent.
g) Signal at 52 ppm in DEPT 135	Due to CH_3 adjacent to O
h) Signal at 22 ppm in DEPT 135	Due to CH_3 at aromatic

IV] UV Spectrum

Observation	Inference
a) 2 peak in UV at 220 nm	Compound is conjugate
b) λ_{max} 238 nm ($\log \epsilon$ 4.2)	Due to $\pi \rightarrow \pi^*$ transition
c) λ_{max} 281 nm ($\log \epsilon$ 2.7)	Due to $n \rightarrow \pi^*$ transition.

Teacher's Sign. :

V] Mass Spectrum

Observation	Inference
a) Molecular ion peak M^{+}	$m/e = 150$
b) Base peak	$m/e = 119$

B] Determination of molecular formula

Rule of 13: $\frac{M}{13} = n+r$

$$\text{No. of carbon} = \frac{M}{13} = \frac{150}{13} = 11$$

$$\text{No. of hydrogen} = M - (C \times 12) = 150 - (11 \times 12) = 150 - 132 = 18$$

$$\therefore \text{Base formula} : C_n H_{n+r} = C_{11} H_{11+7} = C_{11} H_{18}$$

Molecular formula	Add element	Reason of adding	Subtract equivalent	Modified formula	IHD
$C_{11} H_{18}$	-	-	-	$C_{11} H_{18}$	3
$C_{11} H_{18}$	O	Carbonyl group	CH_4	$C_{10} H_{14} O$	4
$C_{10} H_{14} O$	O	IHD is insufficient	CH_4	$C_9 H_{10} O_2$	5

\therefore Molecular formula is $C_9 H_{10} O_2$

c] Detail Observation

If IR spectrum

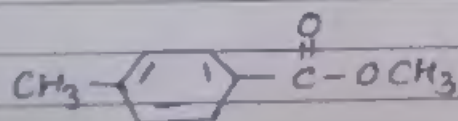
Observation	Inference
a) Strong observation at 1724 cm^{-1}	$C=O$ stretching i.e. carbonyl group is present.
b) Medium observation at region $3100 - 2900 \text{ cm}^{-1}$	$C-H$ stretching alkyl (sp^3) present.
c) Peak at $1600 - 1610 \text{ cm}^{-1}$	$C=C$ stretching, aromatic ring is present.
d) Strong observation near $1100 - 1300 \text{ cm}^{-1}$	$C-O$ stretching is present.

R

Shot on realme UI

• Result:

The structure for given spectral data is



• Spectral identification No :- 2

A] preliminary observation

I] IR Spectroscopy :-

Observation	Inference
a) strong observation at 1718 cm^{-1}	carbonyl group present
b) Medium observation at 3000 cm^{-1}	Alcohol group may be present.

II] ^1H NMR Spectroscopy

Observation	Inference
a) Total 3 peaks are observed	3 types of protons are present.
b) There is no peak region to $6.5-8.5\text{ ppm}$	This is an aliphatic compound.

III] ^{13}C NMR Spectroscopy

Observation	Inference
a) Total 4 peaks are observed	4 types of carbon are present.
b) Peak at 210 ppm	carbonyl carbon is present

IV] UV Spectroscopy :-

Observation	Inference
a) peak at 265 nm	So compound is conjugated.

V] mass spectrum

Observation	Inference
a) molecular ion peak M^{+}	$\text{m/e} = 72$
b) Base peak	$\text{m/e} = 43$

Teacher's Sign.:

B) Determination of Molecular Formula :-

* Rule of 13 :- $\frac{M}{12} = n + r$

$$n = \frac{M}{12} - \frac{r}{12} = 8$$

$$\begin{aligned} \text{No. of Hydrogen } H &= C \times 2 + r \\ &= 16 - 2 \times 8 \\ &= 0 \end{aligned}$$

\therefore Base formula = $C_n H_{2n+2} = C_8 H_{18} = C_8 H_{18}$

Molecular formula	Add Element	Reason of Adding	Subtract equivalent	Modified molecular formula	IHD
$C_8 H_{18}$	-	-	-	$C_8 H_{18}$	$n+1 - \frac{r}{2}$ $8+1 - \frac{18}{2}$ $9-9$ $=0$
$C_8 H_{16}$	O	carbonyl group	CH ₂	$C_8 H_{16} O$	$n+1 - \frac{r}{2}$ $8+1 - \frac{16}{2}$ $9-8$ $=1$

\therefore Molecular formula : $C_8 H_{16} O$

C) Detail observation :-

I) IR Spectrum -

Observation	Inference
a) strong absorption at 1718 cm^{-1}	carbonyl group (aldehyde, ketone) may be present.
b) medium observation at 3000 cm^{-1}	C-H stretching alkyl (sp^3) present.
c) peak at $1100-1200 \text{ cm}^{-1}$	C-O stretching ester or acid, ketone or aldehyde may be present.

EXPERIMENT

II) 1H NMR spectrum :-

Observation	Inference
a) total 3 peaks are observed	3 type of hydrogen are present.
b) there is no peak region 0-1 to 2 ppm	this is no aliphatic group present.
c) peak at 2.4 ppm shows quartet	so, CH ₃ is adjacent to CH ₂ .
d) peak at 2 ppm shows triplet	so, CH ₂ is adjacent to carbonyl carbon.
e) triplet peak at 0.9 ppm	so, CH ₃ is adjacent to CH ₂ .

III) ^{13}C NMR spectrum

Observation	Inference
a) total 3 peaks are observed	4 type of carbon is present.
b) peak at 210 ppm	carbonyl carbon present.
c) peak at region 30-40 ppm	due to CH ₂ group.
d) peak at region 20-30 ppm	due to -CH ₃ group.
e) peak at region 0-10 ppm	due to -CH ₃ group.
f) singlet at 7.9 ppm in proton decoupled spectrum	due to solvent.

IV) UV spectrum -

a) peak at 265 nm	so compound is unsaturated because $\pi \rightarrow \pi^*$ transition.
-------------------	--

V) Mass Spectrum -

a) molecular ion peak M^+	$m/z =$
b) base peak	$m/z =$

II) mass spectrum :-

Observation	Inference
a) molecular ion peak m^+	$m^+ = 192$
b) Base peak	$m^+ = 136$
• Determination of molecular formula :- • Rule of 13 :- $\frac{m^+}{13} = n + \frac{r}{13}$ $n = \text{no. of carbons} = \frac{192}{13} = \frac{192}{13} = 14$ $n = 14$ $\text{no. of Hydrogen} = m - (C \times 12) = 192 - (14 \times 12)$ $= 192 - 168$ $= 24$	
\therefore Base formula = $C_{14}H_{24}$	

Molecular Formula	Add Element	Reason of adding	Subtract equivalent	modified molecular formula	IHD
$C_{14}H_{24}$	-	-	-	$C_{14}H_{24}$	$n+1 = 15/2$ $= 14 + 1 = 15/2$ $= 15 - 12$ $= 3$
$C_{14}H_{24}O$	O	carbonyl group	CH_4	$C_{14}H_{20}O$	4
$C_{12}H_{16}O_2$	O	IHD is insufficient	CH_4	$C_{12}H_{12}O_2$	5

\therefore Molecular formula = $C_{12}H_{16}O_2$

• Detail observation :-

A) IR spectrum :-

Observation	Inference
a) Peak at 1715 cm^{-1}	$C=O$ stretching carbonyl grp present
b) Strong observation at 3000 cm^{-1}	$C-H$ stretching alkyl (sp^3) present
c) Peak at $1600 - 1500 \text{ cm}^{-1}$	$C=C$ stretching, benzene, present
d) Peak at $1200 - 1300 \text{ cm}^{-1}$	$C-O$ stretching, ether, ester acid present.
e) Peak at 120 cm^{-1}	$C-H$ stretching para substituted.

EXPERIMENT

II) 1H NMR spectrum :-

Observation	Inference
a) there are 2 peaks observed	2 type of hydrogen present
b) 2 peaks present at 2.5-3.5 ppm	Aromatic ring is present
c) signal at region 2.5-3.5 ppm	SO_2 is due to aromatic ring
d) signal at region 1.5-2 ppm	CH_3 is present
e) there are doublet in region 2.5-3.5 ppm	as it is para substituted and aromatic ring present

III) ^{13}C NMR spectrum

Observation	Inference
a) there are 2 peaks present	2 type of carbons present
b) peak at 160-165 ppm	Aromatic ring is present
c) peak at range 160-180 ppm	$C=O$ stretching acid, ester, amide is present.
d) Peak at region 30-40 ppm	Aralkyl $C-CH_3$ present
e) peak at 77 ppm	due to solvent
f) peak at 150 ppm	$C=C$ stretching alkene, phenol
g) peak at region 20-30 ppm	$C-C$ stretching Acid, ester, amide is present.

IV) UV Spectrum :-

Observation	Inference
a) a peak at about 260-270 nm	Compound is conjugated
b) Peak at $\lambda_{max} = 262 \text{ nm}$ (log $\epsilon = 2.6$)	Due to $n \rightarrow \pi^*$ transition
c)	

Spectral identification No - 3

A] preliminary observation -

I] IR - Spectroscopy -
observationa) strong observation at
 1766 cm^{-1} b) strong observation at
 3000 cm^{-1}

Inference

C=O stretching carbonyl
group is present.C-H stretching alkyl (sp³)
present.II] ^1H NMR Spectroscopy

observation

a) There are 4 peaks are
observedb) 2 peaks present at region
 $6.5 - 8.5 \text{ ppm}$

Inference

Total 4 type of proton
are present.Aromatic ring may be
presentIII] ^{13}C NMR Spectroscopy

observation

a) There are 2 peaks are
observedb) peak at range $110 - 160$
 ppm

Inference

Total 2 type of carbon
are present.Aromatic ring may be
present.

IV] UV spectrum :-

observation

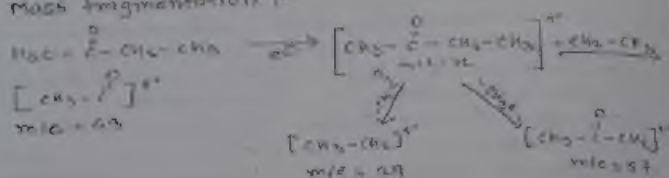
a) peak at 262 nm & 269 nm

Inference

Compound may be
conjugated.

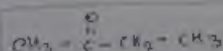
• structure: $\text{H}_3\text{C}-\text{CH}_2-\overset{\text{O}}{\underset{\text{||}}{\text{C}}}-\text{CH}_3$

• Mass fragmentation:-



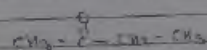
Thus:

From above spectral evidence, following structure can be confirmed:



• Results:-

The structure for given spectral data is



Spectral identification No: 4

A] preliminary observation

I] IR Spectroscopy

Observation	Inference
a) strong observation at 1600 cm^{-1}	C=O carbonyl group is present.
b) medium observation at $1300 - 1200 \text{ cm}^{-1}$	C-O stretching alcohol, ether may be present.

II] ^1H NMR Spectroscopy -

Observation	Inference
a) Total 3 peaks are present.	3 type of proton is present.
b) Signal at region 7-8 ppm.	Aromatic ring may be present.

III] ^{13}C NMR Spectroscopy -

Observation	Inference
a) Total 6 peaks are present.	6 type of carbon is present.
b) 4 peaks are present at region 120-160.	Aromatic ring may be present.

IV] UV Spectrum:-

Observation	Inference
a) peaks at 255 nm	compound may be conjugated.

Teacher's Sign.:

$\left[\begin{array}{c} \text{H} \\ | \\ \text{H} - \text{C} - \text{CO} - \text{C}_6\text{H}_5 \\ | \\ \text{H} \end{array} \right]_n$



4. *Conclusions*

$\frac{1}{n} \sum_{j=1}^n x_j = \bar{x}$

1. 1. 1. 1. 1.



Spectral identification No-5

A] Preliminary observation -

IR Spectroscopy -

Observation	Inference
a) strong observation at 1773 cm^{-1}	carbonyl C=O stretching
b) strong observation at 1738 cm^{-1}	carbonyl C=O stretching carboxylic acid, ester present

II] ^1H NMR Spectroscopy -

Observation	Inference
a) Total 3 peaks are present	3 type of proton present
b) peak at region 7-8 ppm	Aromatic ring may be present.

III] ^{13}C NMR Spectroscopy -

Observation	Inference
a) Total 6 peaks are present	Total 6 type of carbon present
b) peak at region 160-180 ppm	carbonyl C=O stretching acid, ester, amide present.

IV] UV Spectrum -

Observation	Inference
a) peak at about 220 nm	So compound may be conjugated

V] Mass Spectrum -

Observation	Inference
a) Molecular peak m/z	$m/z = 154, 156$
b) Base peak	$m/z = 119$

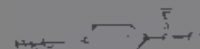


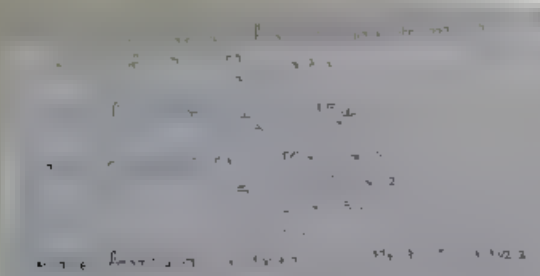
from the above species change forcing structure to
be correct.



Results +

Results +
the structure for 2nd period said =





molecular formula	IR spectrum	Substrate	Product	IR spectrum
$C_{12}H_{10}O$	1735	Aldehyde	Aldehyde	1735
$C_{12}H_{10}O$	1735	Aldehyde	Aldehyde	1735
$C_{12}H_{10}O$	1735	Aldehyde	Aldehyde	1735

molecular formula = $C_{12}H_{10}O$

- IR spectrum -

Observation	Inference
a strong absorption at 1735 cm^{-1}	aldehyde C=O stretching
b strong absorption at 3300 cm^{-1}	aldehyde C-H stretching
c peak at 1600 cm^{-1}	aromatic ring C=C stretching
d peak at 1680-1500 cm^{-1}	aromatic ring C-H stretching
e peak at 725 cm^{-1}	monosubstituted benzene ring

IR spectrum

1. 1735 cm^{-1} (strong) - Aldehyde C=O stretching
 2. 3300 cm^{-1} (strong) - Aldehyde C-H stretching
 3. 1600 cm^{-1} (medium) - Aromatic ring C=C stretching
 4. 1680-1500 cm^{-1} (medium) - Aromatic ring C-H stretching
 5. 725 cm^{-1} (medium) - Monosubstituted benzene ring

^{13}C NMR spectrum

1. 190 ppm - Aldehyde carbonyl C
 2. 160 ppm - Aromatic ring C
 3. 155 ppm - Aromatic ring C
 4. 145 ppm - Aromatic ring C
 5. 135 ppm - Aromatic ring C
 6. 125 ppm - Aromatic ring C
 7. 120 ppm - Aromatic ring C
 8. 115 ppm - Aromatic ring C
 9. 110 ppm - Aromatic ring C
 10. 105 ppm - Aromatic ring C
 11. 100 ppm - Aromatic ring C
 12. 95 ppm - Aromatic ring C
 13. 90 ppm - Aromatic ring C
 14. 85 ppm - Aromatic ring C
 15. 80 ppm - Aromatic ring C
 16. 75 ppm - Aromatic ring C
 17. 70 ppm - Aromatic ring C
 18. 65 ppm - Aromatic ring C
 19. 60 ppm - Aromatic ring C
 20. 55 ppm - Aromatic ring C
 21. 50 ppm - Aromatic ring C
 22. 45 ppm - Aromatic ring C
 23. 40 ppm - Aromatic ring C
 24. 35 ppm - Aromatic ring C
 25. 30 ppm - Aromatic ring C
 26. 25 ppm - Aromatic ring C
 27. 20 ppm - Aromatic ring C
 28. 15 ppm - Aromatic ring C
 29. 10 ppm - Aromatic ring C
 30. 5 ppm - Aromatic ring C

1H NMR spectrum

1. 9.8 ppm (1H, s) - Aldehyde proton
 2. 7.5-7.8 ppm (5H, m) - Aromatic protons
 3. 2.5-3.0 ppm (2H, m) - Aromatic protons

Mass spectrum

1. 190 m/z (base peak) - Aldehyde molecular ion
 2. 160 m/z - Aromatic ring C₁₀H₈O⁺
 3. 155 m/z - Aromatic ring C₁₀H₇O⁺
 4. 145 m/z - Aromatic ring C₁₀H₆O⁺
 5. 135 m/z - Aromatic ring C₁₀H₅O⁺
 6. 125 m/z - Aromatic ring C₁₀H₄O⁺
 7. 120 m/z - Aromatic ring C₁₀H₃O⁺
 8. 115 m/z - Aromatic ring C₁₀H₂O⁺
 9. 110 m/z - Aromatic ring C₁₀H₁O⁺
 10. 105 m/z - Aromatic ring C₁₀H₀O⁺
 11. 100 m/z - Aromatic ring C₉H₈O⁺
 12. 95 m/z - Aromatic ring C₉H₇O⁺
 13. 90 m/z - Aromatic ring C₉H₆O⁺
 14. 85 m/z - Aromatic ring C₉H₅O⁺
 15. 80 m/z - Aromatic ring C₉H₄O⁺
 16. 75 m/z - Aromatic ring C₉H₃O⁺
 17. 70 m/z - Aromatic ring C₉H₂O⁺
 18. 65 m/z - Aromatic ring C₉H₁O⁺
 19. 60 m/z - Aromatic ring C₉H₀O⁺
 20. 55 m/z - Aromatic ring C₈H₈O⁺
 21. 50 m/z - Aromatic ring C₈H₇O⁺
 22. 45 m/z - Aromatic ring C₈H₆O⁺
 23. 40 m/z - Aromatic ring C₈H₅O⁺
 24. 35 m/z - Aromatic ring C₈H₄O⁺
 25. 30 m/z - Aromatic ring C₈H₃O⁺
 26. 25 m/z - Aromatic ring C₈H₂O⁺
 27. 20 m/z - Aromatic ring C₈H₁O⁺
 28. 15 m/z - Aromatic ring C₈H₀O⁺
 29. 10 m/z - Aromatic ring C₇H₈O⁺
 30. 5 m/z - Aromatic ring C₇H₇O⁺

• Spectral identification No - 6

II] Preliminary observation -

I] IR Spectroscopy -

Observation	Inference
a) Observation at 1673 cm^{-1}	$\text{C}=\text{O}$ stretching aldehyde, ketone may be present.
b) Observation at 1600 cm^{-1}	$\text{C}=\text{C}$ stretching. Benzene may be present.

II] ^1H NMR Spectroscopy -

Observation	Inference
a) 3 peaks are observed	Total 3 peaks types of proton are present.
b) Two peaks present in region 7-8 ppm.	Aromatic ring may be present.

III] ^{13}C NMR Spectroscopy -

Observation	Inference
a) Total 6 peaks are observed.	Total 6 types of carbon are present.
b) Peak present at region 110-160 ppm.	Aromatic ring may be present.

IV] UV Spectrum -

Observation	Inference
a) Peak at above 220 nm	Compound may be conjugated.

1. ^{13}C NMR spectroscopy
 2. ^1H NMR spectroscopy
 3. IR spectroscopy
 4. Mass spectroscopy
 5. UV spectroscopy

• ^{13}C NMR spectroscopy
 • ^1H NMR spectroscopy
 • IR spectroscopy
 • Mass spectroscopy
 • UV spectroscopy

Observation: ^{13}C NMR spectroscopy
 Inference: ^{13}C NMR spectroscopy

Observation: ^1H NMR spectroscopy
 Inference: ^1H NMR spectroscopy

Observation: IR spectroscopy
 Inference: IR spectroscopy

Observation: Mass spectroscopy
 Inference: Mass spectroscopy

Observation: UV spectroscopy
 Inference: UV spectroscopy

1. ^{13}C NMR spectroscopy
 2. ^1H NMR spectroscopy
 3. IR spectroscopy
 4. Mass spectroscopy
 5. UV spectroscopy

Observation: ^{13}C NMR spectroscopy
 Inference: ^{13}C NMR spectroscopy

Observation: ^1H NMR spectroscopy
 Inference: ^1H NMR spectroscopy

Observation: IR spectroscopy
 Inference: IR spectroscopy

Observation: Mass spectroscopy
 Inference: Mass spectroscopy

Observation: UV spectroscopy
 Inference: UV spectroscopy

Spectral identification No - 7

Preliminary observation -

I] IR Spectroscopy -

Observation	Inference
a) Strong peak at region 1700 cm^{-1}	C=O stretching ketone & aldehyde may be present.
b) Medium peak at region $3000 - 2700\text{ cm}^{-1}$	C-H stretching alkene may be present.

II] ^1H NMR Spectroscopy -

Observation	Inference
a) There are 4 peaks are observed	Total four type of proton are present.
b) Two peaks at region $6.5 - 8\text{ ppm}$	Aromatic ring may be present.

III] ^{13}C NMR Spectroscopy -

Observation	Inference
a) There are 6 peaks are observed.	Total 6 type of carbon are present.
b) peak observed at $160 - 130\text{ ppm}$.	carbonyl group may be present.

IV] UV Spectrum -

Observation	Inference
a) peak at above 220 nm	Compound may be conjugated.



in matrix, the elements are following structure is



Result 5:

If the structure for the matrix is



IR spectrum of compound

IR spectrum of compound

IR spectrum of compound

• Detailed observation

• IR spectrum observation

Inference

IR spectrum observation

IR spectrum observation

IR spectrum observation

IR spectrum observation

IR spectrum observation

IR Spectrum

IR spectrum observation

IR Spectrum

IR spectrum observation

IR Spectrum

IR spectrum observation

IR Spectrum

IR spectrum observation

1. Preliminary identification is

At preliminary observation.

II IR Spectroscopy

Observation Inference

a) Strong peak at 3300 cm^{-1} as stretching may be present

b) Peak at 1715 cm^{-1} C=O stretching may be present

III ^1H NMR Spectroscopy:

Observation Inference

a) They are five peaks are Total 6 peaks are type of observed proton.

b) Peak at region $\delta 5$ - Aromatic ring may be present.

IV ^{13}C NMR Spectroscopy:

Observation

Inference

a) There are 5 peaks are Total 5 type of carbon observed.

b) Peak at 110 to 160 ppm Aromatic ring may be present

V UV Spectroscopy:

Observation

Inference

a) $\log \epsilon - 3.5$ UV spectrum due to $\pi \rightarrow \pi^*$ transition hydroxy group present

VI Mass Spectrometry:

Observation

Inference

a) Molecular peak ion M^+ $m/e = 138$

b) Base peak $m/e = 107$

IR Spectrum

IR Spectrum

IR Spectrum

IR Spectrum

IR Spectrum

IR Spectrum

IR Spectrum

Observation

IR Spectrum

Inference

IR Spectrum

IR Spectrum

IR Spectrum

¹³C NMR Spectrum

¹³C NMR Spectrum

¹H NMR Spectrum

¹H NMR Spectrum

the structure of the compound is given below.



Results:

The structure of the given compound is



EXPERIMENT

[No]

- Electro. conductivity of soln
- Primary observation
- IR spectroscopy
- Observation

Inference

- Strong absorption at 1700 cm^{-1} \rightarrow Carbonyl group may be present
- Peak at 1600 cm^{-1} \rightarrow Aromatic ring may be present

II. ^1H NMR Spectroscopy -

Observation

Inference

- There are 3 peaks observed \rightarrow Total 3 types of ^1H are present
- Peak at $\delta = 7.5$ \rightarrow Para-disubstituted aromatic ring present

III. ^{13}C NMR Spectroscopy -

Observation

Inference

- There are 6 peaks are observed \rightarrow Total 6 type of carbons are present.
- Peak at region $160-165 \text{ ppm}$ \rightarrow Aromatic ring may be present.

IV. Mass Spectrum -

Observation

Inference

- Molecular peak ion $m/e = 146$
- Base peak $m/e = 145$

$$\begin{aligned} & \text{we get } u_1 = 1, u_2 = 0, u_3 = 1, u_4 = 0, u_5 = 1 \\ & \text{and } u_6 = 0, u_7 = 1, u_8 = 0, u_9 = 1, u_{10} = 0 \\ & \text{and } u_{11} = 1, u_{12} = 0, u_{13} = 1, u_{14} = 0, u_{15} = 1 \\ & \text{and } u_{16} = 0, u_{17} = 1, u_{18} = 0, u_{19} = 1, u_{20} = 0 \\ & \text{and } u_{21} = 1, u_{22} = 0, u_{23} = 1, u_{24} = 0, u_{25} = 1 \\ & \text{and } u_{26} = 0, u_{27} = 1, u_{28} = 0, u_{29} = 1, u_{30} = 0 \\ & \text{and } u_{31} = 1, u_{32} = 0, u_{33} = 1, u_{34} = 0, u_{35} = 1 \\ & \text{and } u_{36} = 0, u_{37} = 1, u_{38} = 0, u_{39} = 1, u_{40} = 0 \\ & \text{and } u_{41} = 1, u_{42} = 0, u_{43} = 1, u_{44} = 0, u_{45} = 1 \\ & \text{and } u_{46} = 0, u_{47} = 1, u_{48} = 0, u_{49} = 1, u_{50} = 0 \\ & \text{and } u_{51} = 1, u_{52} = 0, u_{53} = 1, u_{54} = 0, u_{55} = 1 \\ & \text{and } u_{56} = 0, u_{57} = 1, u_{58} = 0, u_{59} = 1, u_{60} = 0 \\ & \text{and } u_{61} = 1, u_{62} = 0, u_{63} = 1, u_{64} = 0, u_{65} = 1 \\ & \text{and } u_{66} = 0, u_{67} = 1, u_{68} = 0, u_{69} = 1, u_{70} = 0 \\ & \text{and } u_{71} = 1, u_{72} = 0, u_{73} = 1, u_{74} = 0, u_{75} = 1 \\ & \text{and } u_{76} = 0, u_{77} = 1, u_{78} = 0, u_{79} = 1, u_{80} = 0 \\ & \text{and } u_{81} = 1, u_{82} = 0, u_{83} = 1, u_{84} = 0, u_{85} = 1 \\ & \text{and } u_{86} = 0, u_{87} = 1, u_{88} = 0, u_{89} = 1, u_{90} = 0 \\ & \text{and } u_{91} = 1, u_{92} = 0, u_{93} = 1, u_{94} = 0, u_{95} = 1 \\ & \text{and } u_{96} = 0, u_{97} = 1, u_{98} = 0, u_{99} = 1, u_{100} = 0 \end{aligned}$$

1040843

[illegible]

and

a) $\frac{1}{2} \text{ mol}$ of H_2O and $\frac{1}{2} \text{ mol}$ of H_2O_2
 b) $\frac{1}{2} \text{ mol}$ of H_2O and $\frac{1}{2} \text{ mol}$ of H_2O_2

~~IV: 10055-5024~~

10	1. <u>Formal</u>	1. <u>Formal</u>	1. <u>Formal</u>
9	2. <u>Informal</u>	2. <u>Informal</u>	2. <u>Informal</u>
8	3. <u>Formal</u>	3. <u>Formal</u>	3. <u>Formal</u>
7	4. <u>Formal</u>	4. <u>Formal</u>	4. <u>Formal</u>
6	5. <u>Formal</u>	5. <u>Formal</u>	5. <u>Formal</u>
5	6. <u>Formal</u>	6. <u>Formal</u>	6. <u>Formal</u>
4	7. <u>Formal</u>	7. <u>Formal</u>	7. <u>Formal</u>
3	8. <u>Formal</u>	8. <u>Formal</u>	8. <u>Formal</u>
2	9. <u>Formal</u>	9. <u>Formal</u>	9. <u>Formal</u>
1	10. <u>Formal</u>	10. <u>Formal</u>	10. <u>Formal</u>

[illegible]

$\frac{1}{x^2} = x^{-2}$

$$\frac{d}{dx} x^{-2} = -2x^{-3} = -\frac{2}{x^3}$$
$$\frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\infty} f(x) \delta(x-a) dx = f(a)$$

the following structure is the product of the reaction



Results:

The structure of the product is:



• Spectral identification no - 10

AI preliminary observation -

I] IR Spectroscopy

Observation

Inference

a) Strong observation at 3300 cm^{-1}

C-H stretching alkane may be present

b) Medium observation at $1600 - 1500\text{ cm}^{-1}$

C=C stretching benzene may be present

II] ^1H -NMR Spectroscopy -
Observation

Inference

a) Two peaks are observed

Two type of protons are present.

b) peak at 6-8 ppm.

Aromatic ring may be present.

III] ^{13}C NMR Spectroscopy -
Observation

Inference

a) 4 peaks are observed.

4 types of carbon are present.

b) peak at 110-160 ppm.

Aromatic ring may be present.

IV] UV Spectrum -

Observation

Inference

a) peak are about 220 nm

compound may be conjugated.

200,5 2009 (9)

$$16 = 2^4$$

15 = 21%

- determination of molecular formula -

Rule of 13 = $\frac{M}{13} = 91.538$

$$\text{No. of carbons} = \frac{18}{1.82} = 9.89$$
$$(2(x)) = W \text{ is a graph of } y = W$$

831-031 =
831-031 =

Base formula: $C_nH_{n+2} = C_nH_{n+2} = C_nH_{n+2}$

— 144 —

- detail observation -
- IR spectrum -

Observation

40. $\frac{1}{2} \log_2 16 = 2$

1. உயிரினங்களின் பரஸ்பரம் தொடர்பு (9)

400 ବର୍ଷ - ଯେତେ ଯାଏନା
ଏହି ଯୁଗର ଯୁଗର ଯୁଗର ଯୁଗର

Public at 7:00-7:50

442

α -H stretching alkane is present.
 mono-substituted C-H stretch-
 ring aromatic ring present
 $\text{C}=\text{C}$ stretching aromatic ring present.

Infirmary

II: $\frac{1}{2} \log 8 = 1.5$

[illegible]

19. 0.45-0.50 m.

c) Preis, $n = 7$ - 8, 5000

[illegible][illegible]

b) $\frac{1}{2} \text{ mole of } \text{NaOH}$

[illegible]

1997-98	11	12

06/01/2010	06/01/2010	06/01/2010
06/01/2010	06/01/2010	06/01/2010

at least 25 above 22

[illegible]

II	Mass Spectrum
----	---------------


2)	Michaela Peale, I
	1998-1999

b) Base. Preis

--	--

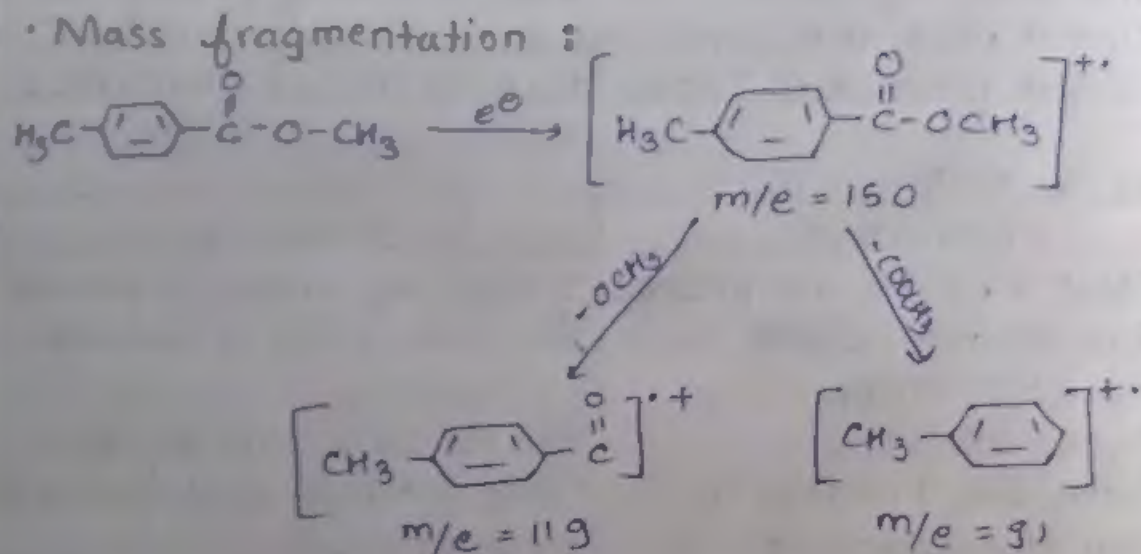
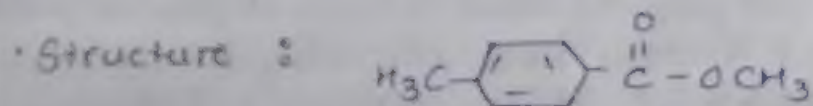
--	--

An aerial photograph showing a road intersection. A crosswalk is visible on the road, and a vehicle is stopped at the intersection. The surrounding area appears to be a mix of urban and suburban development.

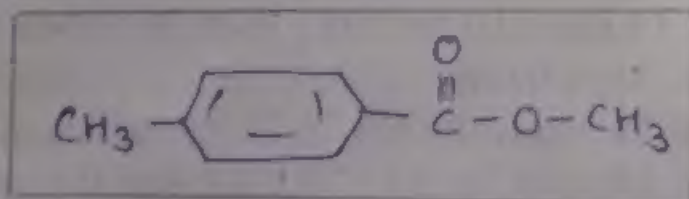


V] Mass spectrum

Observation	Inference
a) Molecular ion peak M^{+}	$m/e = 150$
b) Base peak	$m/e = 119$



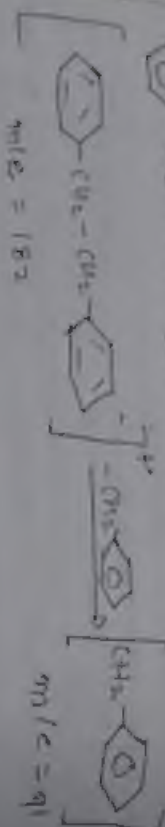
Thus, from above spectral evidence, the following structure can be confirmed.



Structure -

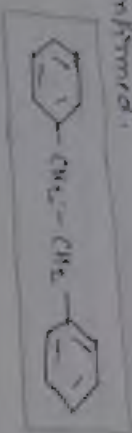


Mass Fragmentation -



$m/e = 182$

The from spectral evidences the following structure is confirmed.



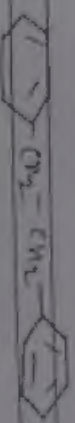
EXPERIMENT

No.

Date

Results -

The structure for given spectral data is



Signature

Date